

What is claimed is:

1 1. A retrofocus, wide-angle lens formed of two lens groups, in order from the object side, as
2 follows:

3 a first lens group having negative refractive power;

4 a stop; and

5 a second lens group having positive refractive power;

6 wherein

7 said first lens group includes a meniscus lens element having positive refractive power
8 with its convex surface on the object side, two meniscus lens elements, each of negative
9 refractive power with its convex surface on the object side, and a lens that has a center thickness
10 that is greater than the center thickness of any of said three meniscus lens elements; and

11 said second lens group includes a cemented lens component that includes a lens element
12 having negative refractive power that is cemented to a biconvex lens element, an air space, and a
13 meniscus lens component having negative refractive power with its concave surface on the object
14 side.

1 2. The retrofocus, wide-angle lens of claim 1, wherein said meniscus lens component of said
2 second lens group consists of a lens element.

1 3. The retrofocus, wide-angle lens of claim 2, wherein said meniscus lens component of said
2 second lens group is separated from said biconvex lens element only by said air space.

1 4. The retrofocus, wide-angle lens of claim 3, wherein the following condition is satisfied:

$$1 < | R / R' | < 1.08$$

3 where

4 R is the radius of curvature of the object-side lens surface of said meniscus lens
5 component of said second lens group; and

6 R' is the radius of curvature of the image-side lens surface of said biconvex lens element.

1 5. The retrofocus, wide-angle lens of claim 1, wherein said meniscus lens component of said
2 second lens group is separated from said biconvex lens element only by said air space.

1 6. The retrofocus, wide-angle lens of claim 5, wherein the following condition is satisfied:

2 $1 < |R / R'| < 1.08$

3 where

4 R is the radius of curvature of the object-side lens surface of said meniscus lens
5 component of said second lens group; and

6 R' is the radius of curvature of the image-side lens surface of said biconvex lens element.

1 7. The retrofocus, wide-angle lens of claim 1, wherein the following condition is satisfied:

2 $1 < |R / R'| < 1.08$

3 where

4 R is the radius of curvature of the object-side lens surface of said meniscus lens
5 component of said second lens group; and

6 R' is the radius of curvature of the image-side lens surface of said biconvex lens element.

1 8. The retrofocus, wide-angle lens of claim 2, wherein the following condition is satisfied:

2 $1 < |R / R'| < 1.08$

3 where

4 R is the radius of curvature of the object-side lens surface of said meniscus lens
5 component of said second lens group; and

6 R' is the radius of curvature of the image-side lens surface of said biconvex lens element.

1 9. The retrofocus, wide-angle lens of claim 4, wherein the following conditions are satisfied:

2 $vB - vA > 25$

3 $vB > 65$

4 $1.38 < |\varphi/R'| < 1.65$

5 where

6 vA is the Abbe number at the d-line of the lens material of the lens element having

7 negative refractive power of the cemented lens component of the second lens group;

8 vB is the Abbe number at the d-line of the lens material of said biconvex lens element of
9 the second lens group; and

10 φ is the effective diameter of the image-side lens surface of said biconvex lens element of
11 the second lens group.

1 10. The retrofocus, wide-angle lens of claim 6, wherein the following conditions are satisfied:

2 $vB - vA > 25$

3 $vB > 65$

4 $1.38 < |\varphi / R'| < 1.65$

5 where

6 vA is the Abbe number at the d-line of the lens material of the lens element having
7 negative refractive power of the cemented lens component of the second lens group;

8 vB is the Abbe number at the d-line of the lens material of said biconvex lens element of
9 the second lens group; and

10 φ is the effective diameter of the image-side lens surface of said biconvex lens element of
11 the second lens group.

1 11. The retrofocus, wide-angle lens of claim 7, wherein the following conditions are satisfied:

2 $vB - vA > 25$

3 $vB > 65$

4 $1.38 < |\varphi / R'| < 1.65$

5 where

6 vA is the Abbe number at the d-line of the lens material of the lens element having
7 negative refractive power of the cemented lens component of the second lens group;

8 vB is the Abbe number at the d-line of the lens material of said biconvex lens element of
9 the second lens group; and

10 φ is the effective diameter of the image-side lens surface of said biconvex lens element of
11 the second lens group.

1 12. The retrofocus, wide-angle lens of claim 8, wherein the following conditions are satisfied:

2 $vB - vA > 25$

3 $vB > 65$

4 $1.38 < |\varphi/R'| < 1.65$

5 where

6 vA is the Abbe number at the d-line of the lens material of the lens element having
7 negative refractive power of the cemented lens component of the second lens group;

8 vB is the Abbe number at the d-line of the lens material of said biconvex lens element of
9 the second lens group; and

10 φ is the effective diameter of the image-side lens surface of said biconvex lens element of
11 the second lens group.

1 13. The retrofocus, wide-angle lens of claim 1, wherein the following conditions are satisfied:

2 $vB - vA > 25$

3 $vB > 65$

4 $1.38 < |\varphi/R'| < 1.65$

5 where

6 vA is the Abbe number at the d-line of the lens material of the lens element having
7 negative refractive power of the cemented lens component of the second lens group;

8 vB is the Abbe number at the d-line of the lens material of said biconvex lens element of
9 the second lens group;

10 φ is the effective diameter of the image-side lens surface of said biconvex lens element of
11 the second lens group; and

12 R' is the radius of curvature of the image-side lens surface of said biconvex lens element.

1 14. The retrofocus, wide-angle lens of claim 9, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;

5 the lens element of said cemented lens component having negative refractive power;
6 the biconvex lens element of said cemented lens component;
7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and
9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 15. The retrofocus, wide-angle lens of claim 10, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;
5 the lens element of said cemented lens component having negative refractive power;
6 the biconvex lens element of said cemented lens component;
7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and
9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 16. The retrofocus, wide-angle lens of claim 11, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;
5 the lens element of said cemented lens component having negative refractive power;
6 the biconvex lens element of said cemented lens component;
7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and
9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 17. The retrofocus, wide-angle lens of claim 13, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;

5 the lens element of said cemented lens component having negative refractive power;

6 the biconvex lens element of said cemented lens component;

7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and

9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 18. The retrofocus, wide-angle lens of claim 1, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;

5 the lens element of said cemented lens component having negative refractive power;

6 the biconvex lens element of said cemented lens component;

7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and

9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 19. The retrofocus, wide-angle lens of claim 12, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;

5 the lens element of said cemented lens component having negative refractive power;

6 the biconvex lens element of said cemented lens component;

7 the meniscus lens component having negative refractive power with its concave surface

8 on the object side; and
9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.

1 20. The retrofocus, wide-angle lens of claim 8, wherein said second lens group comprises, in
2 order from the object side:

3 the meniscus lens component having positive refractive power with its convex surface on
4 the image side;

5 the lens element of said cemented lens component having negative refractive power;

6 the biconvex lens element of said cemented lens component;

7 the meniscus lens component having negative refractive power with its concave surface
8 on the object side; and

9 a second meniscus lens component having positive refractive power with its convex
10 surface on the image side.